

# Armed Forces College of Medicine AFCM



Muscle stretch

## Classification of human reflexes

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### **INTENDED LEARNING OBJECTIVES (ILO)**



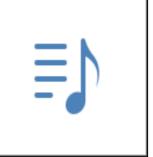
### By the end of this lecture the student will be able to:

- Classify human reflexes
- Explain each one
- Explain the character and clinical significance of each
- Classify spinal reflexes
- Explain each

3

### **Classification of Human Reflexes**





Human reflexes

Uncondition ed

Conditione

Hypothala mic Reflexes

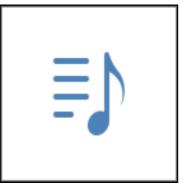
Brainstem reflexes

Spinal reflexes

### Classification of Spinal Reflexes

CNS modul





Superficial reflexes

Spinal reflexes

Deep reflexes

Visceral reflexes

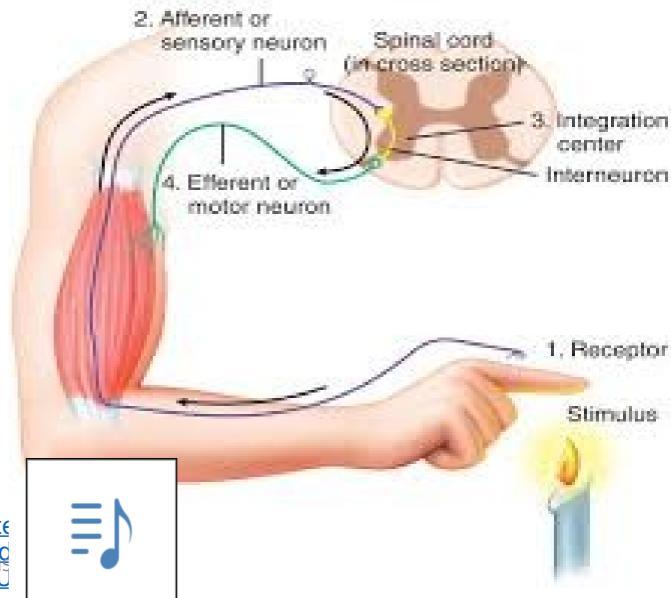
### Superficial Reflexes: Withdrawal Reflex. (1)



- ✓ This is a protective and prepotent reflex (inhibits other reflexes).
- ✓ Stimulus: noxious stimulus to ...
- ✓ Afferent nerve: Aδ and C
  nerve fibers (pain
  afferents).

  https://encryp
- ✓ Efferent: alpha

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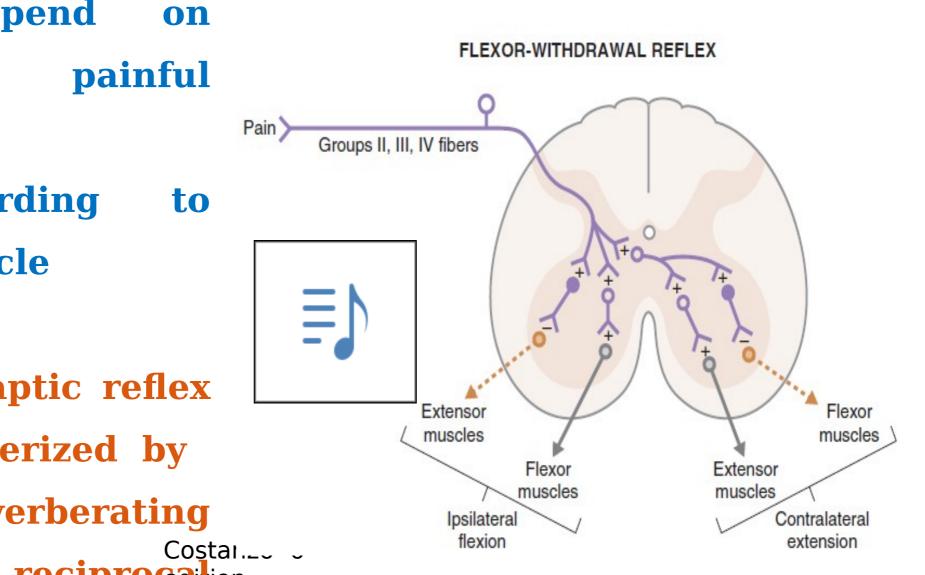


### Superficial Reflexes: Withdrawal Reflexes

- ✓ Response: depend on
  - degree of painful
  - stimulation:
- ✓ Centre: according to stimulated muscle
- **✓** Function :

oirouite

✓ It is a polysynaptic reflex that is characterized by irradiation, reverberating



### Superficial reflexes: Crossed extensor Reflex



✓ Stimulus : Strong noxious stimulus of one limb

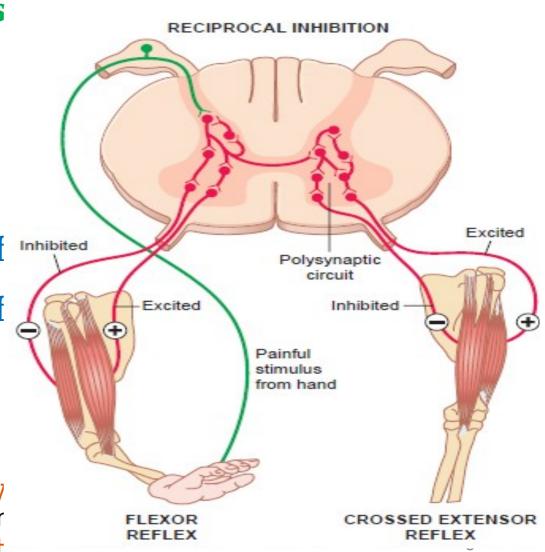
✓ Afferent nerve: .....

✓ Efferent: .....

✓ Response : reflex exte opposite limb ( as a withdrawal reflex).

**✓ Center: .....** 

✓ It is polysynaptic reflex that follow Guyton ar withdrawal reflex with longer ditent



### Superficial reflexes: Positive supporting Reflex (reaction)

✓ Stimulus: Deep pressure on the sole foot (by the body weight during standing)

**✓** Response: Contraction of both the flexors and the extensors to support the body in an upright position

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Centre: motor neuron pool

against gravity.

9&h=261&g=positive%20supporting%20reaction

### Superficial reflexes: Planter Reflex



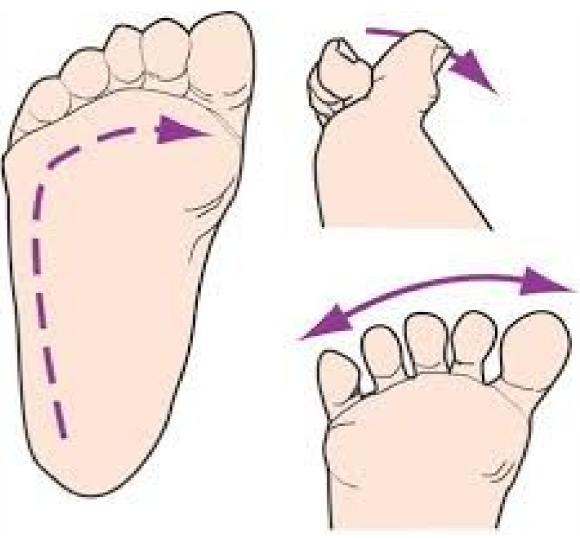
- ✓ Stimulus: scratching the lateral side of the sole from below upwards and then medially leads to plantar flexion of toes.
- **✓** Response: planter flexion of the toes.
- Abnormal response

  dorsiflexion of high toe 54.0439

  fanning of oth s. Thise&ised:

  AAAAAAB,

  named positive Babinski signsns module



### Superficial reflexes: Planter



### Reflex

## physiological conditions

( pseudo positive Babinski

Newly born infants (below 1 year)

due to lack of myelination of the



leep

## Pathological conditions

- \* General anesthesia
- **√Coma**
- **✓** Upper motor neuron lesion.
- **√** Partial positive Babinskis



### **Activity:**

## Mention the importance of interneurons in the reflexes you studied?

### Superficial Reflexes: Abdominal Reflexes (\*\*)



✓ Stimulus: Scratching of the abdominal skin by blunt object.

**✓** Response: Contraction **d** dominal nt of the muscles as indicated by umbilicus in opposite direction to scratch (type of withdrawal reflex). Intact tract is needed for its pyramidal appearance>



Abnormality: it needs intact upp %2F71%2F56%2F95%2F8715695\_m.jpg&imgrefurl=https%3A%2F https://www.google.cc %2Fwww.cram.com%2Fflashcards%2Fsuperficial-reflexes-

neuron to function, so it is usual 1475 268 thrid OKX 672BZG664 vM&vet=12ahUKEwiZIJHc\_KzrAhUW1IUKHWNHDygowygaegular D8AQ..i&docid=HFLgtlRXJttfaM&w=192&h=165&q=abdominal %20%20reflex&safe=active&ved=2ahUKEwiZIJHc KzrAhUW1IUKHWNHDygQMyga

### Superficial reflexes.



#### 1) Cremasteric reflex:

- ✓ Stimulus: Scratching the skin of the inner aspect of the thigh in males.
- ✓ Response: Contraction of the cremasteric muscle and elevation of the testis.
- ✓ Center: L1–2

#### 2) Anal reflex:

**✓ Stimulus: scratching the skin around the anus.** 



- **✓** Response: contraction of external anal sphincter.
- $\checkmark$  Centre: S3-4



### B) Deep (Proprioceptive) Spinal Reflexes

- 1. Stretch Reflex: mentioned later.
- 2. Inverse stretch reflex: mentioned later.





- 3. Micturition and defecation Reflexes: S 2-4:
- 4.Erection S 2-4
- 5.Cold pressor effect (exposure of the skin to cold leads to VC)

6.Peritoneal irritation leads to relaxation of GIT wall

### **Lecture Quiz**



### The withdrawal reflex is initiated by stimulation of which of the following receptors?

- a) Muscle spindle
- b) Joint capsule receptor
- c) Cutaneous free nerve ending
- d) Golgi tendon organ

### e) Pacinian corpuscles **Reflex contraction of the extensor muscles of the right leg can** :occur following

- a) Hitting a chair with the left foot.
- b) Stretching the flexor muscles in the right leg
- c) Stretching of the flexor muscles in left hand
- d) Excessive stretch of extensors of the right leg
- e) Painful kicking of the right knee. CNS module

#### **SUGGESTED TEXTBOOKS**



1. Ganong review 25<sup>th</sup> edition chapter 9 from page 206 to

212

2. Ghyton and Hall 13th edidition from page 696 to 701